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Chiu

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(54) **TREADMILL**

(71) Applicant: **FITEK FITNESS PRODUCTS INC.**, Minsyong Township (TW)

(72) Inventor: **Jui-Chung Chiu**, Minsyong Township (TW)

(73) Assignee: **FITEK FITNESS PRODUCTS INC.**, Minsyong Township (TW)

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A63B 23/04 (2006.01)
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(58) **Field of Classification Search**
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See application file for complete search history.

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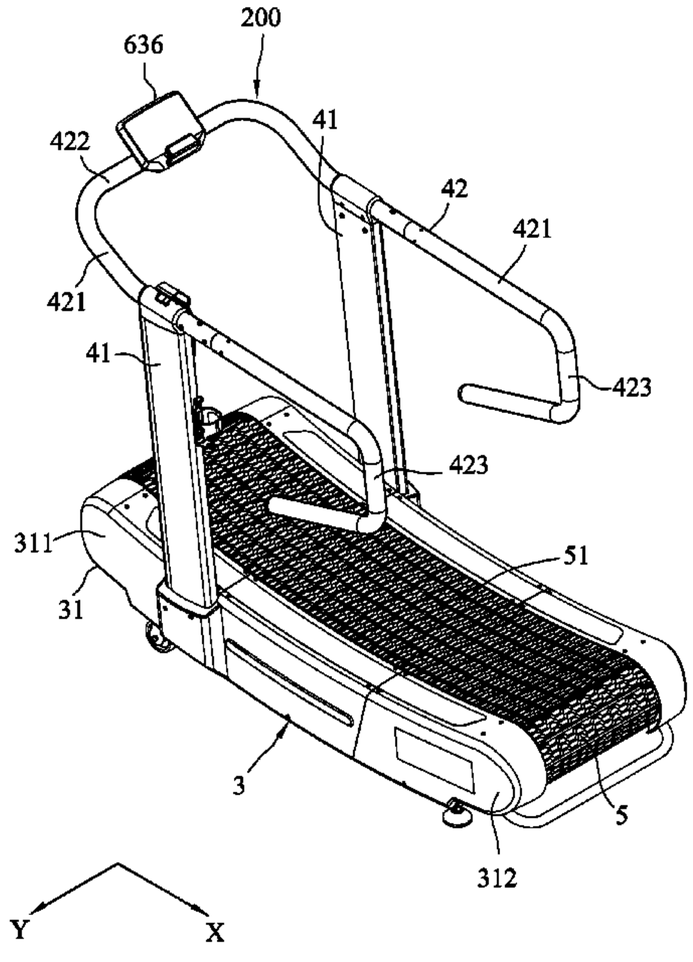
Primary Examiner — Garrett K Atkinson
(74) *Attorney, Agent, or Firm* — DLA Piper LLP (US)

(57) **ABSTRACT**

A treadmill includes a base frame and an one-way damping device. The one-way damping device includes a rotatable braking plate, an one-way clutch, and a resistance unit. The resistance unit is fixedly mounted to the base frame and abuts against the braking plate. The one-way clutch is sleeved on one of two rotating shafts of the base frame, is not engaged with the braking plate when the rotating shafts are rotated in a first rotational direction, and is engaged with the braking plate when the rotating shafts are rotated in a second rotational direction, which in turn drives the braking plate to co-rotate against a frictional force between the braking plate and the resistance unit.

14 Claims, 12 Drawing Sheets



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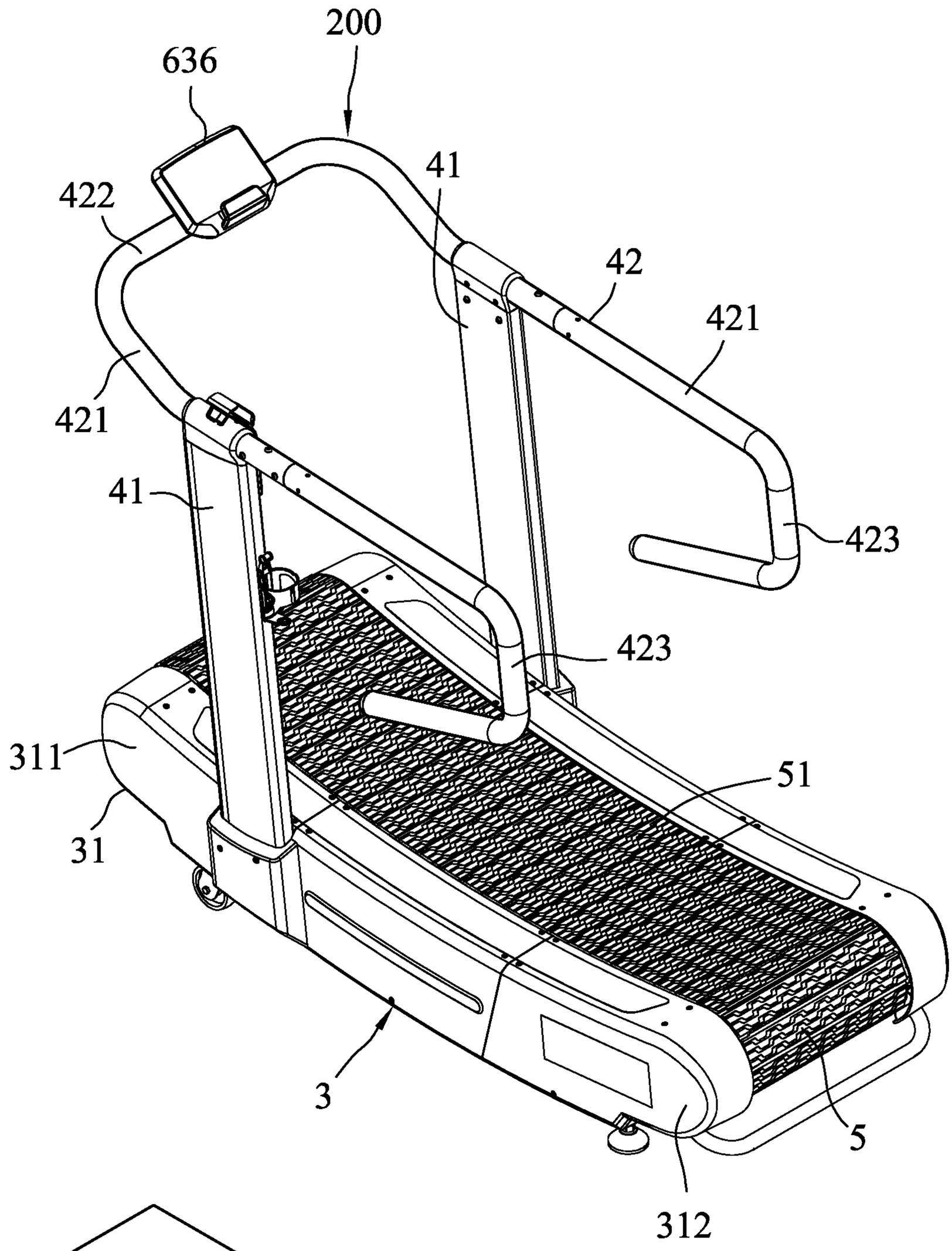
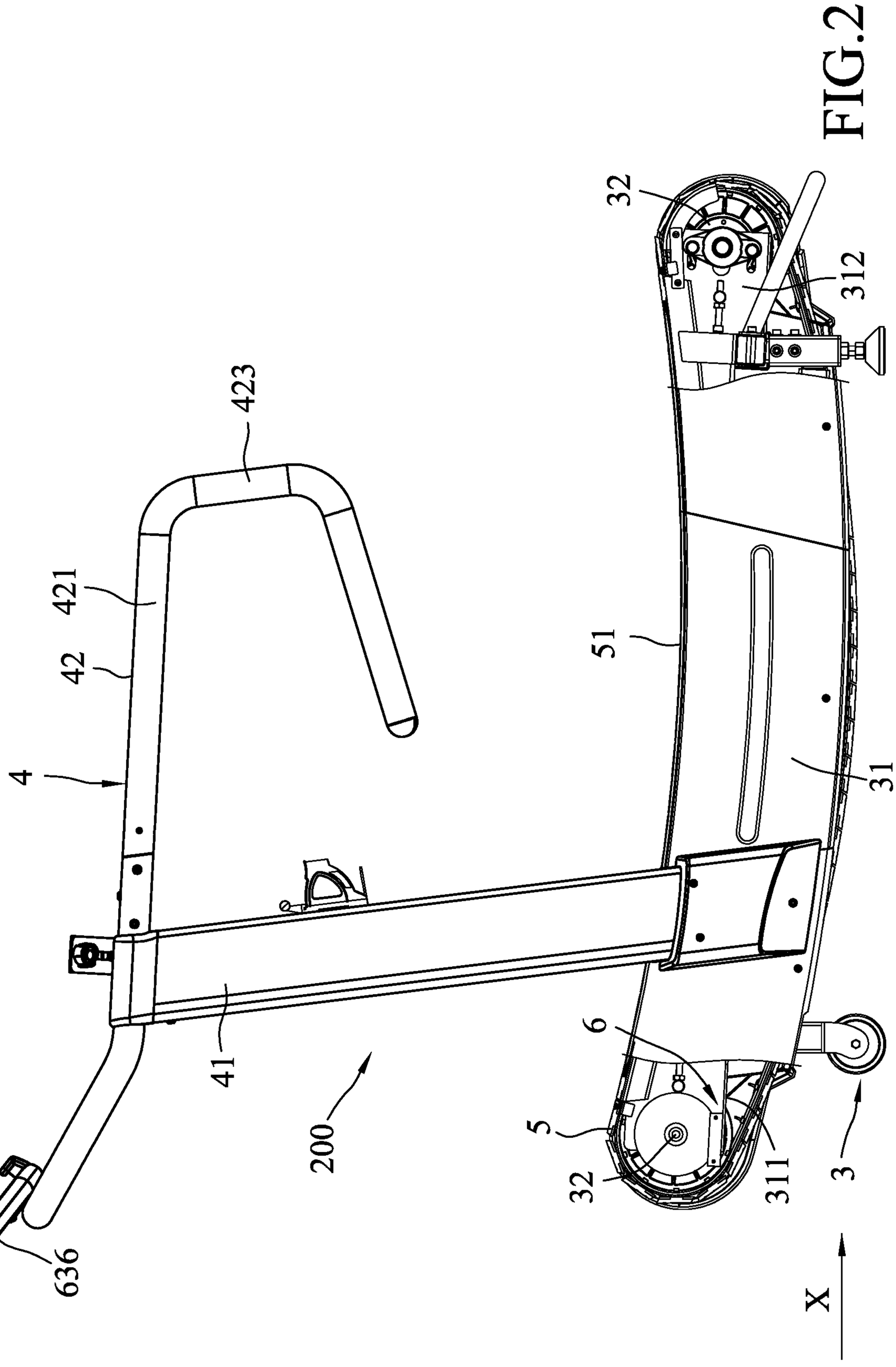


FIG.1

FIG.2



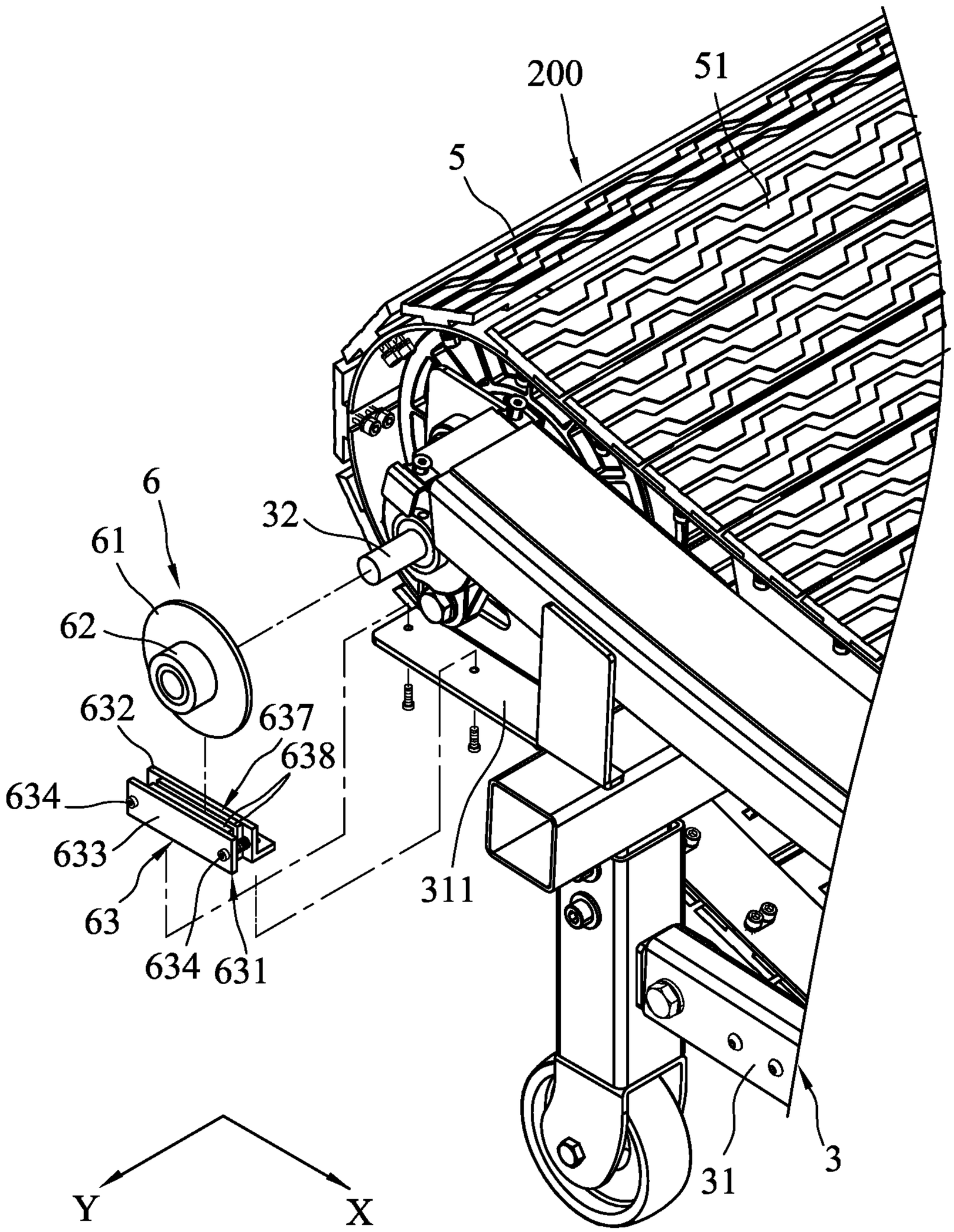


FIG.3

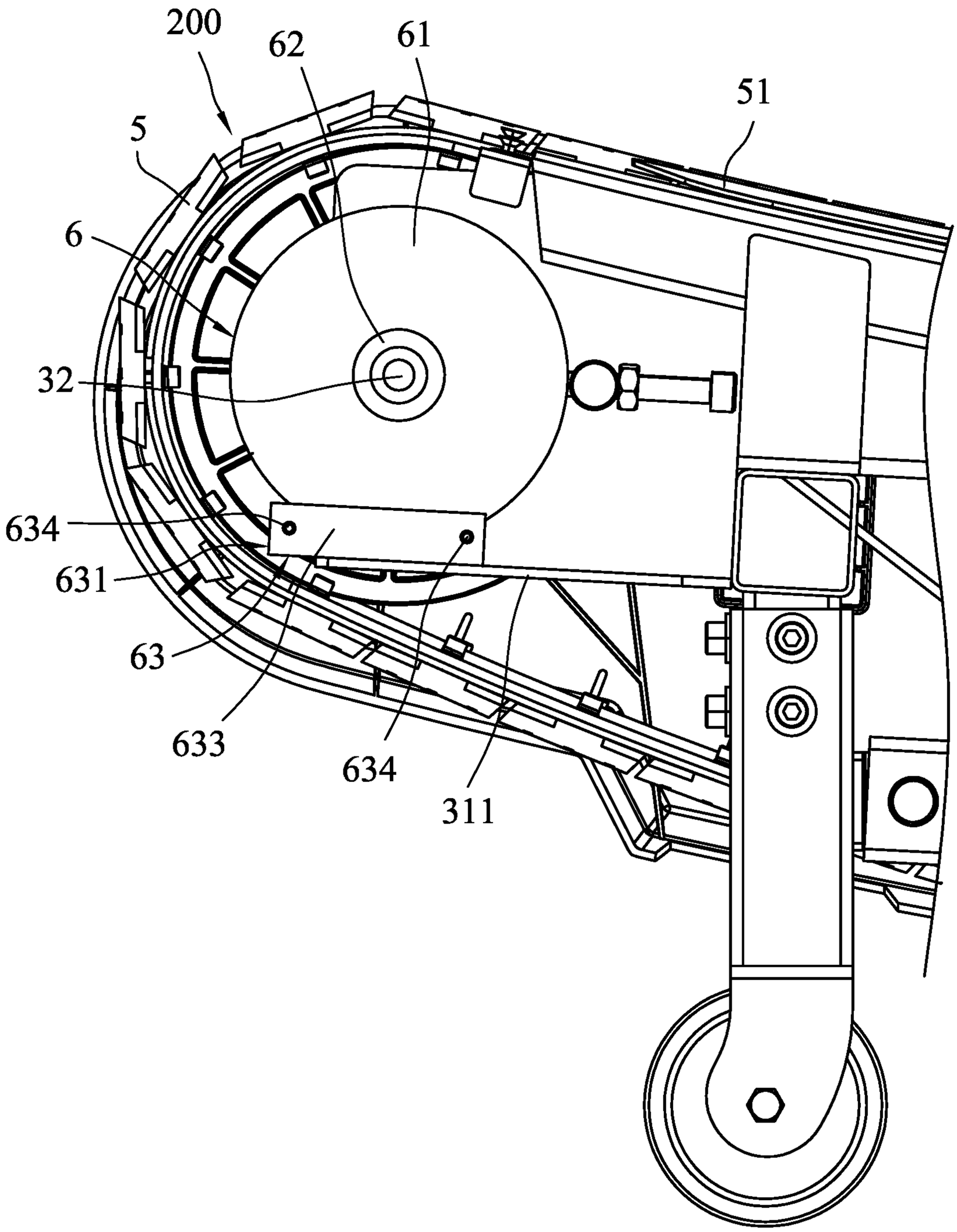


FIG.4

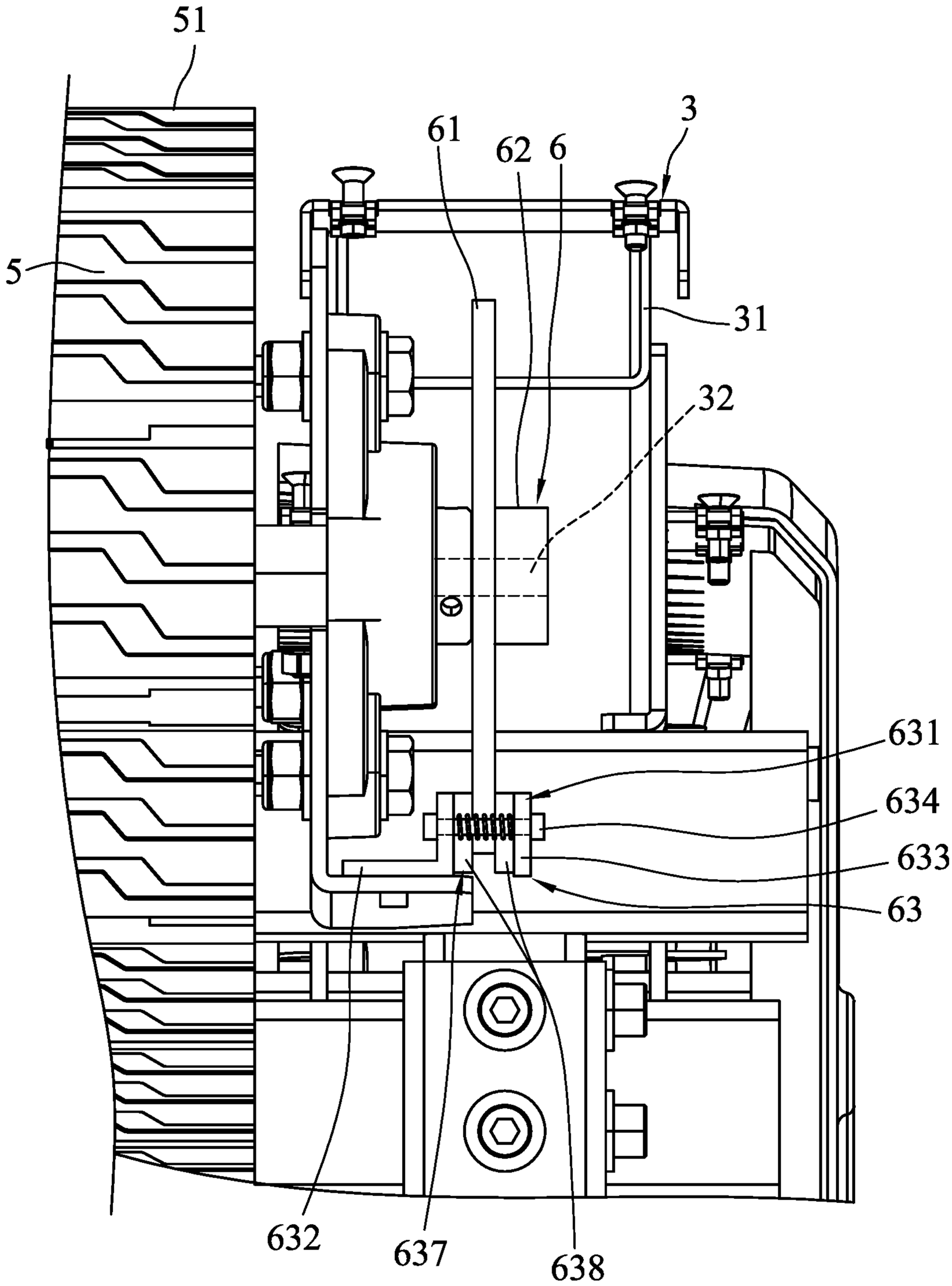


FIG.5

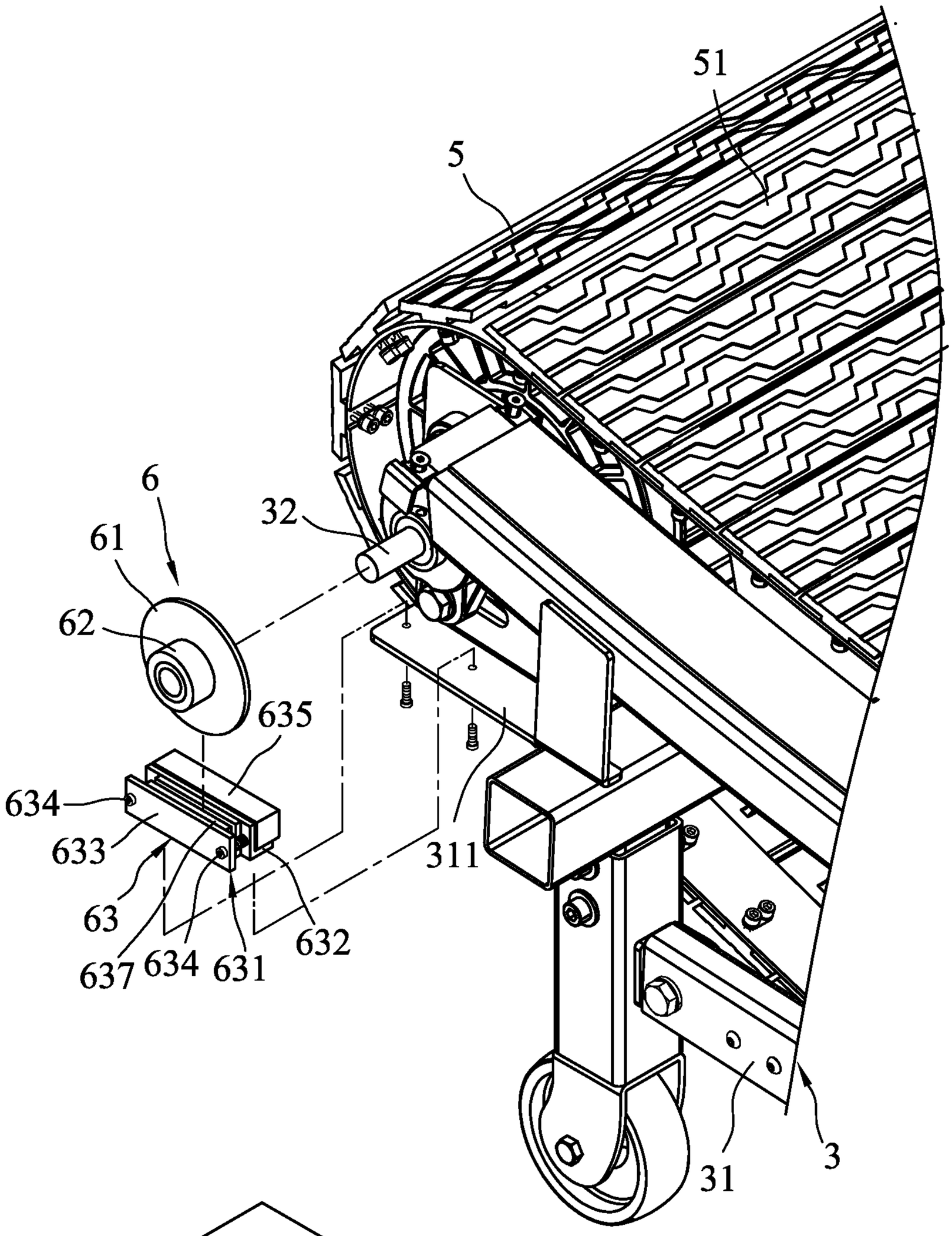


FIG.6

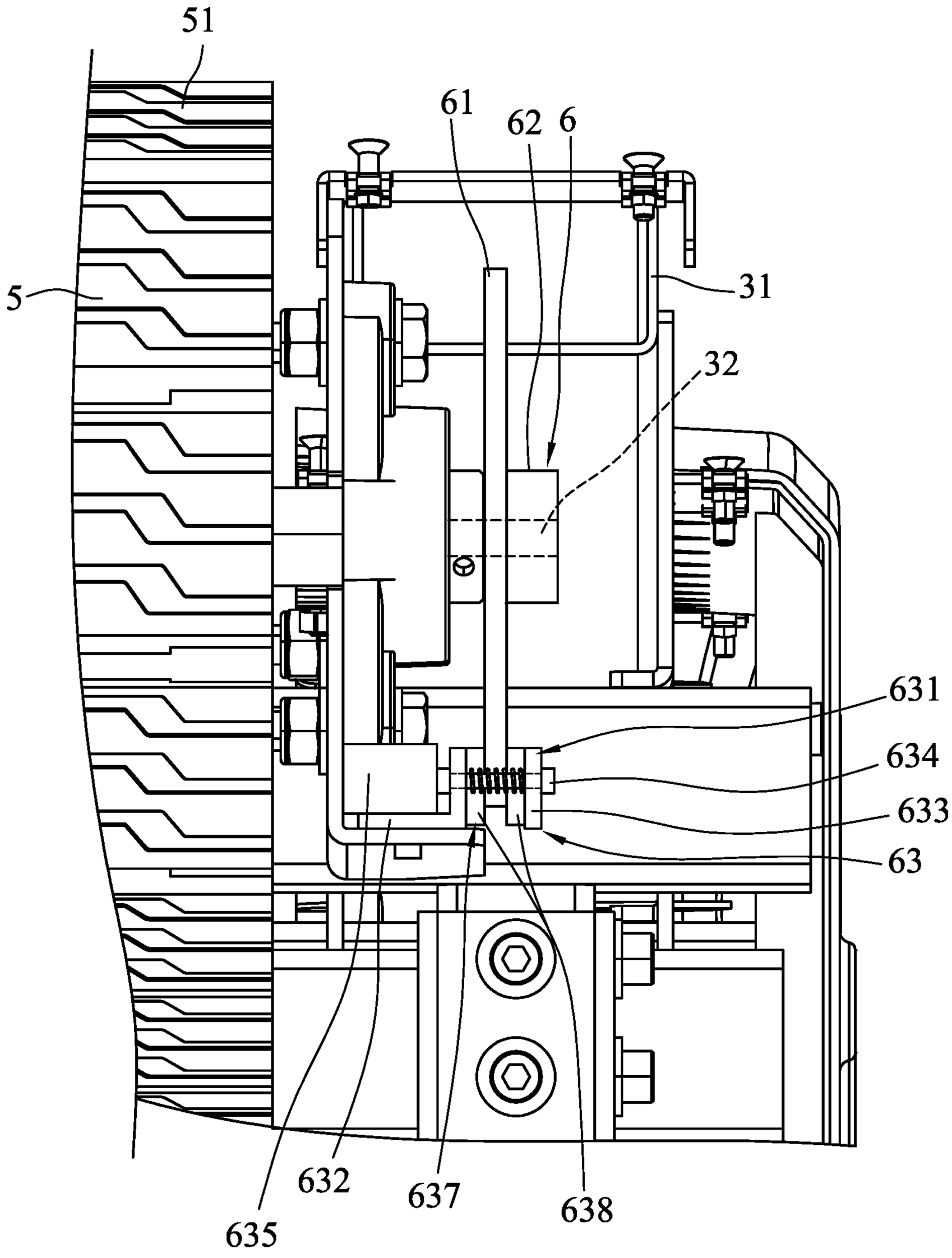


FIG.7

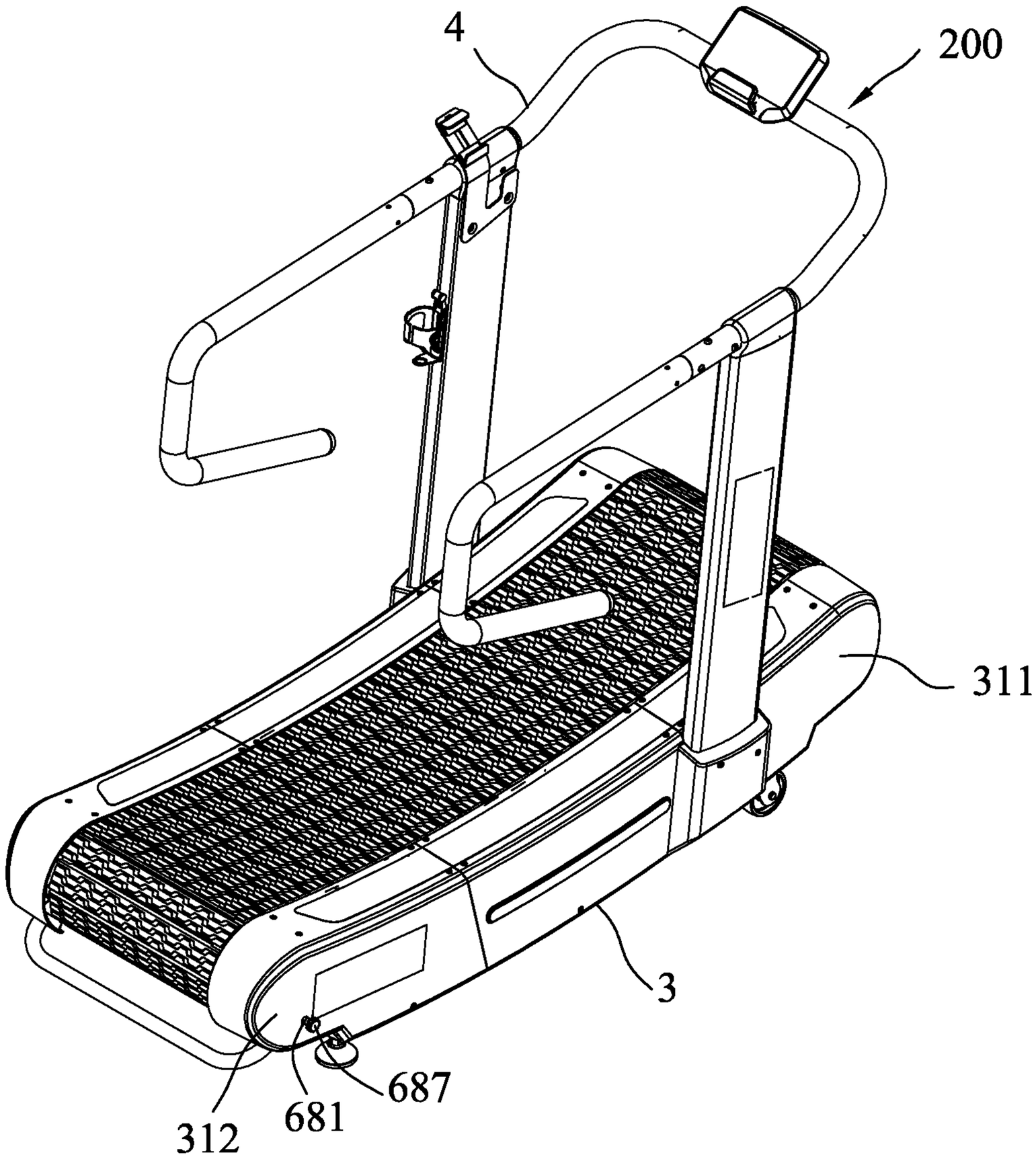
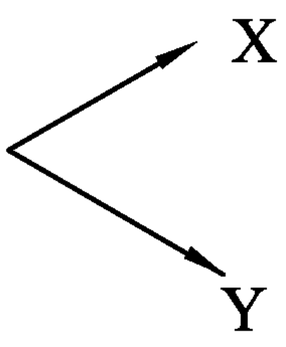


FIG.8



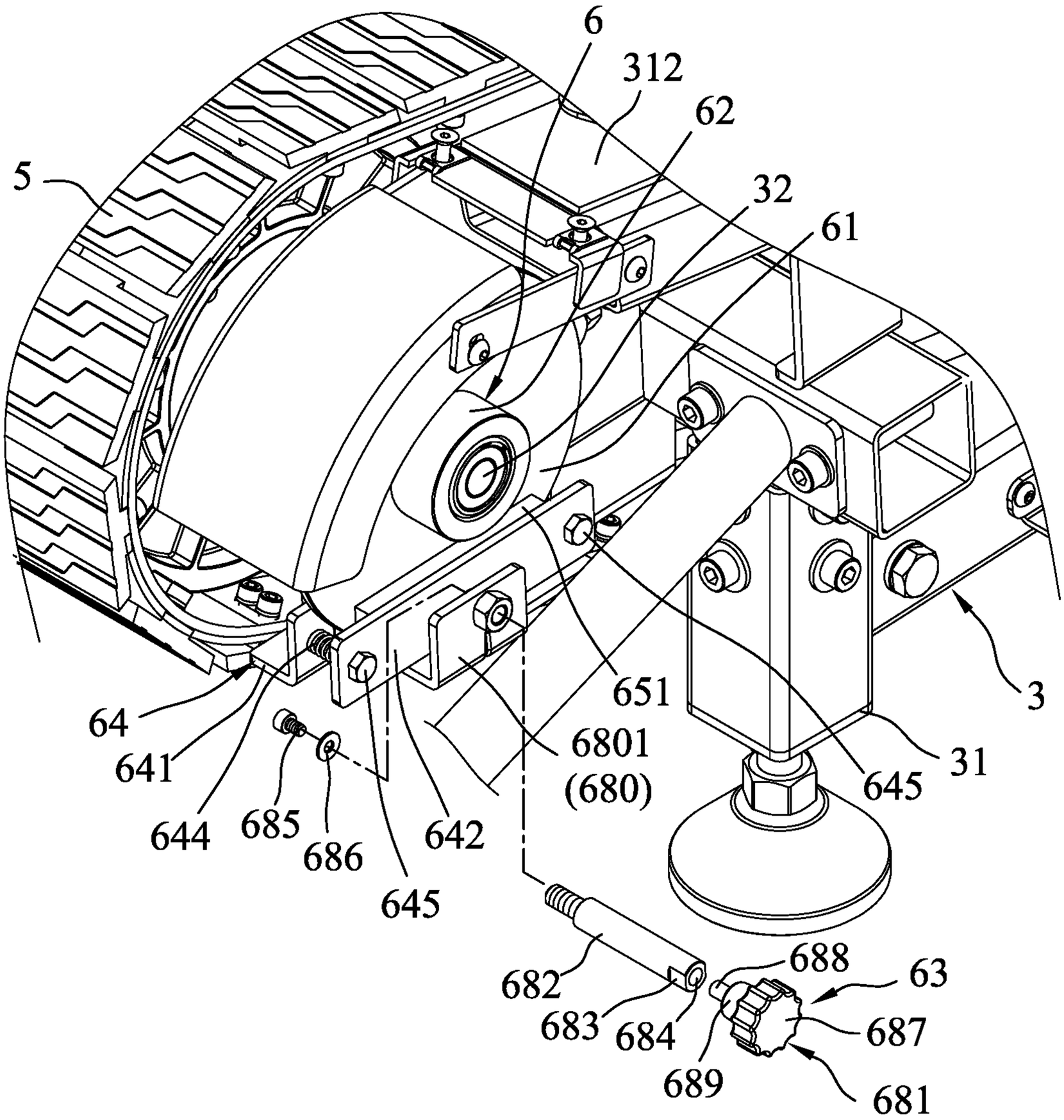

6
312
62
5
32
61
651
3
64
641
6801
(680)
645
31
644
685
686
642
645
688
63
682
683
684
687
689
681

FIG.9

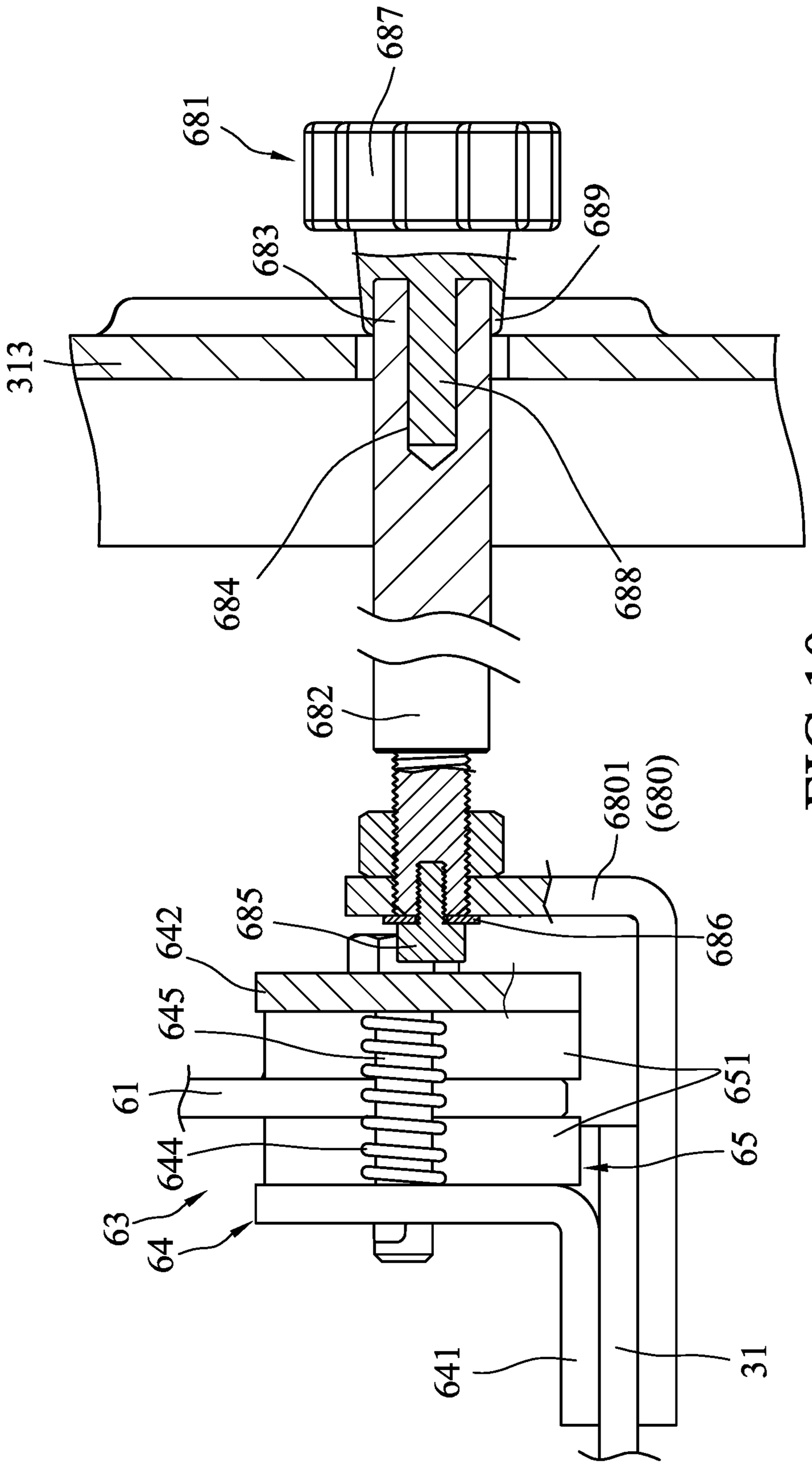

687
681
689
683
313
684
688
682
6801
(680)
642
685
686
645
61
651
644
65
63
64
641
31
Y

FIG.10

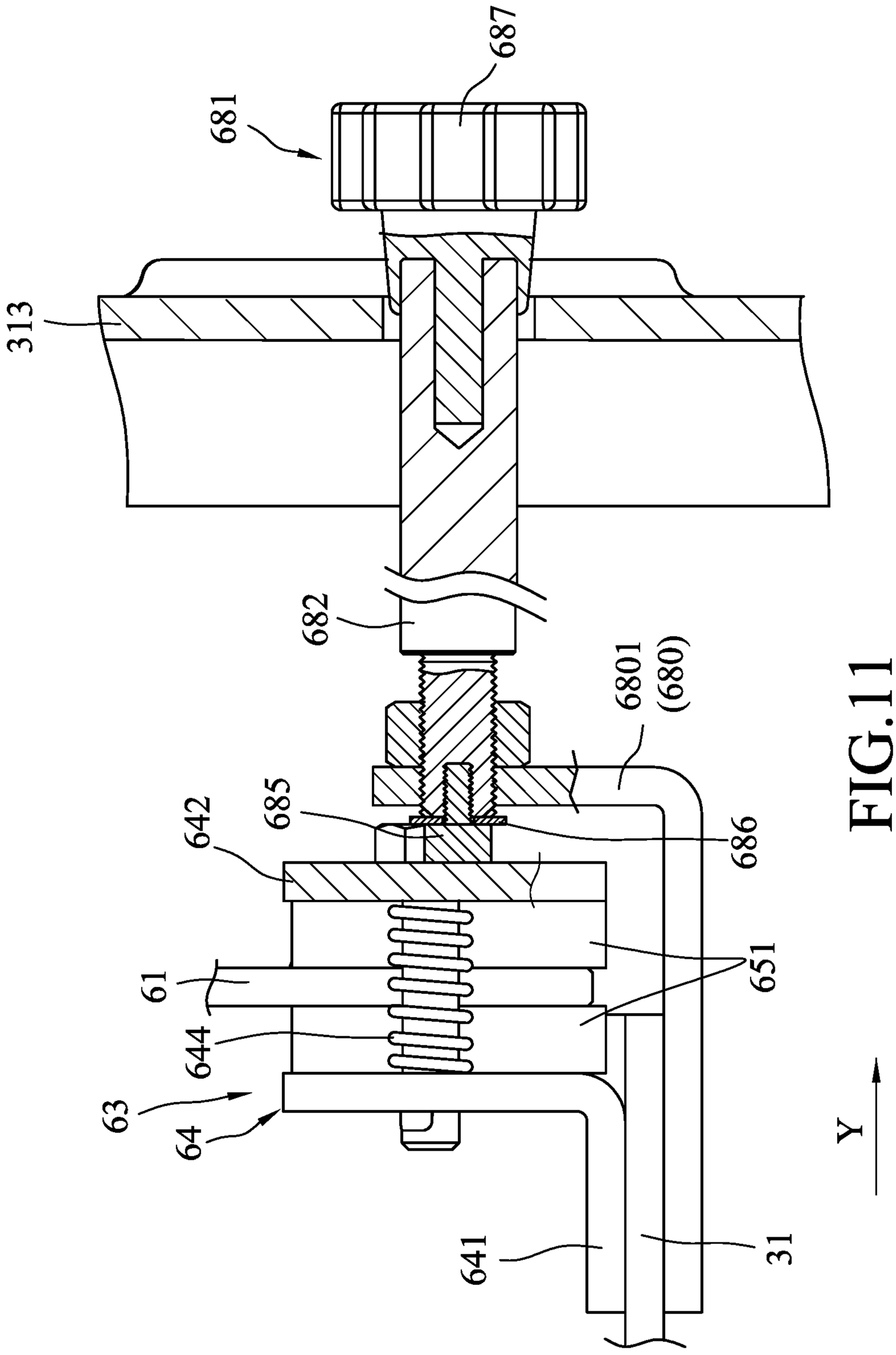


FIG.11

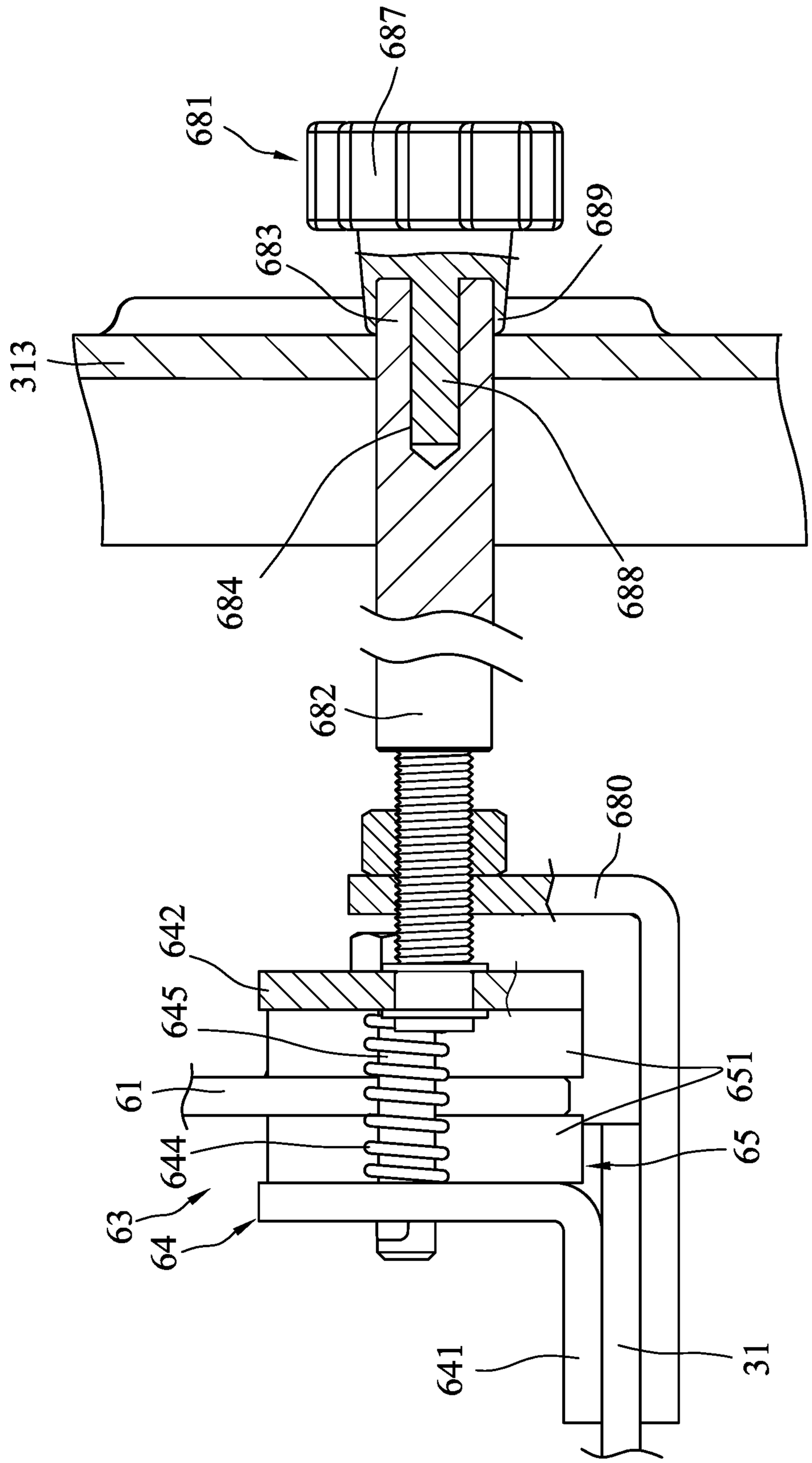

687
681
689
683
313
684
688
682
680
642
645
644
61
651
65
63
64
641
31
Y

FIG.12

TREADMILL

CROSS-REFERENCE TO RELATED APPLICATION

This application claims priority of Taiwanese Patent Applications No. 107215329, filed on Nov. 12, 2018, and No. 107217732, filed on Dec. 27, 2018.

FIELD

The disclosure relates to a type of exercise equipment, and more particularly to a treadmill.

BACKGROUND

A conventional treadmill having a treadmill belt is usually built with a safety mechanism, which ensures safety of a user when boarding onto the treadmill. The safety mechanism locks rotation of the treadmill belt in one direction, thus preventing the possibility of user slipping due to backward rotation of the treadmill belt. As such, the treadmill belt is no longer operable to rotate in the other direction, thereby resulting in a relatively poor flexibility in use.

SUMMARY

Therefore, an object of the disclosure is to provide a treadmill that can alleviate the drawback of the prior art.

According to the disclosure, the treadmill includes a base frame, a treadmill belt, and an one-way damping device. The base frame includes a frame body that has a front end portion and a rear end portion opposite to the front end portion in a front-rear direction, and two rotating shafts that are respectively mounted to the front and rear end portions of the frame body. Each of the rotating shafts is rotatable relative to the frame body about a rotational axis which extends in a left-right direction transverse to the front-rear direction.

The treadmill belt is trained on the rotating shafts, and has a top section that is defined between top ends of the rotating shafts. The top section is rearwardly movable around the rotating shafts to drive each of the rotating shafts to rotate about the rotational axis in a first rotational direction, and is forwardly movable around the rotating shafts to drive each of the rotating shafts to rotate about the rotational axis in a second rotational direction which is opposite to the first rotational direction.

The one-way damping device includes a braking plate, an one-way clutch, and a resistance unit. The braking plate is rotatable about a rotational axis extending in the left-right direction. The one-way clutch is sleeved on one of the rotating shafts, is not engaged with the braking plate when the top section of the treadmill belt is moved rearwardly, and is engaged with the braking plate when the top section of the treadmill belt is moved forwardly such that rotation of the one of the rotating shafts in the second rotational direction drives the braking plate to rotate in the second rotational direction via the one-way clutch. The resistance unit is fixedly mounted to the frame body and abuts against the braking plate so that, when the top section of the treadmill belt is moved forwardly, the braking plate is rotated in the second rotational direction against a frictional force between the braking plate and the resistance unit.

BRIEF DESCRIPTION OF THE DRAWINGS

Other features and advantages of the disclosure will become apparent in the following detailed description of the embodiment with reference to the accompanying drawings, of which:

FIG. **1** is a perspective view of a first embodiment of a treadmill according to the disclosure;

FIG. **2** is a partly sectional side view of the first embodiment;

FIG. **3** is a fragmentary partly exploded perspective view of the first embodiment;

FIG. **4** is a fragmentary side view of the first embodiment;

FIG. **5** is a fragmentary front view of the first embodiment;

FIG. **6** is a fragmentary partly exploded perspective view of a second embodiment according to the disclosure;

FIG. **7** is a fragmentary front view of the second embodiment;

FIG. **8** is a perspective view of a third embodiment according to the disclosure;

FIG. **9** is a fragmentary partly exploded perspective view of the third embodiment;

FIG. **10** is a fragmentary, partly sectional rearview of the third embodiment;

FIG. **11** is a view similar to FIG. **10**, illustrating an adjusting screw subunit being driven to push a movable seat; and

FIG. **12** illustrates a modification to the third embodiment.

DETAILED DESCRIPTION

Before the disclosure is described in greater detail, it should be noted that where considered appropriate, reference numerals or terminal portions of reference numerals have been repeated among the figures to indicate corresponding or analogous elements, which may optionally have similar characteristics.

Referring to FIGS. **1** to **3**, an embodiment of a treadmill **200** according to the disclosure includes a base frame **3**, a handrail unit **4**, a treadmill belt **5** and an one-way damping device **6**.

The base frame **3** includes a frame body **31** that has a front end portion **311** and a rear end portion **312** opposite to the front end portion **311** in a front-rear direction (X), and two rotating shafts **32** that are respectively mounted to the front and rear end portions **311**, **312** of the frame body **31**. Each of the rotating shafts **32** is rotatable relative to the frame body **31** about a rotational axis which extends in a left-right direction (Y) transverse to the front-rear direction (X).

The handrail unit **4** includes two support frames **41** that are fixedly and respectively mounted to opposite left and right ends of the frame body **31** of the base frame **3**, and a handgrip **42** that is mounted to a top end of the support frames **41**. Each of the support frames **41** has a bottom end connected fixedly to the frame body **31**. The handgrip **42** has two side rail sections **421** that extend substantially in the front-rear direction (X) and that are respectively and fixedly mounted on top ends of the supporting frames **41**, a front rail section **422** that extends in the left-right direction (Y) and that interconnects front ends of the side rail sections **421**, and two hook-shaped tail sections **423**. Each of the hook-shaped tail sections **423** has a first part extending downwardly from a rear end of a respective one of the side rail sections **421**, and a second part extending forwardly from a bottom end of the first part.

The treadmill belt **5** is trained on the rotating shafts **32** and has a top section **51** that is defined between top ends of the rotating shafts **32**. The top section **51** is rearwardly movable around the rotating shafts **32** to drive each of the rotating shafts **32** to rotate about the rotational axis in a first rotational direction, and is forwardly movable around the rotating shafts **32** to drive each of the rotating shafts **32** to

rotate about the rotational axis in a second rotational direction, which is opposite to the first rotational direction.

Referring to FIGS. **3** to **5**, the one-way damping device **6** includes a braking plate **61** that is rotatable about a rotational axis extending in the left-right direction (Y). In this embodiment, the braking plate **61** is sleeved coaxially on one of the rotational shafts **32**, and the rotational axis of the braking plate **61** overlaps the rotational axis of the one of the rotational shafts **32**. The one-way damping device **6** further includes an one-way clutch **62** that is sleeved on the one of the rotating shafts **32**, and a resistance unit **63** that is fixedly mounted to the front end portion **311** of the frame body **31** and that abuts against the braking plate **61**. In this embodiment, the one-way damping device **6** is mounted to the left end of the frame body **31** and is connected to the rotating shaft **32** mounted to the front end portion **311** of the frame body **31**, but may be mounted to the right end of the frame body **31** and/or be connected to the rotating shaft **32** mounted to the rear end portion **312** of the frame body **31** in other embodiments.

The resistance unit **63** includes an adjusting subunit **64** and a friction producing subunit **65**. The adjusting subunit **64** has a stationary seat **641** that is fixedly mounted to the frame body **31**, a movable seat **642** that is spaced apart from the stationary seat **641** in the left-right direction (Y), at least one adjusting members **643**, and at least one resilient members **644**. In this embodiment, the adjusting subunit **64** includes two adjusting members **643** and two resilient members **644**.

The stationary seat **641** and the movable seat **642** are disposed respectively at opposite sides of the braking plate **61**. In this embodiment, the stationary seat **641** is disposed to the right of the braking plate **61**, and the movable seat **642** is disposed to the left of the braking plate **61** and the stationary seat **641**.

The adjusting members **643** are spaced apart in the front-rear direction (X) and extend in the left-right direction (Y) to interconnect the stationary seat **641** and the movable seat **642**. The adjusting members **643** are operable to adjust a distance between the stationary seat **641** and the movable seat **642**. In this embodiment, the adjusting members **643** are screws that threadedly engage the stationary seat **641** and the movable seat **642**, and are rotatable to move the movable seat **642** in the left-right direction (Y) relative to the stationary seat **641**.

In this embodiment, each of the resilient member **644** is sleeved on a respective one of the adjusting members **643**, and has two opposite ends respectively and resiliently abutting against the stationary seat **641** and the movable seat **642**.

The friction producing subunit **65** includes two resistance members **651** that are respectively and fixedly connected to the stationary seat **641** and the movable seat **642**, and that abut against the braking plate **61** (i.e., the resistance members **651** cooperatively clamp the braking plate **61** therebetween) for generating a frictional force between the braking plate **61** and the resistance members **651**. In this embodiment, a user rotates each of the adjusting members **643** to adjust the distance between the stationary seat **641** and the movable seat **642** in the left-right direction (Y), which in turn adjusts the magnitude of the frictional force. In other embodiments, adjusting the magnitude of the frictional force can be achieved by using braking mechanism commonly seen in bicycles or flywheels instead.

Referring back to FIGS. **1**, **3** and **5**, for different exercising uses of the treadmill **200**, the user may apply walking or running force onto the treadmill belt **5** to drive the top section **51** of the treadmill belt **5** to move in one of two opposite directions: one direction for regular running exercise, and the other direction for leg muscle training.

In order to undergo regular running exercise, the user continuously drives the top section **51** to move rearwardly. During this state, the one-way clutch **62** is not engaged with the braking plate **61**, so that the rotating shafts **32** can easily rotate in the first rotational direction.

On the other hand, to undergo leg muscle training, the user may turn toward the rear end portion **312** of the frame body **31** to continuously drives the top section **51** to move forwardly. During this state, the one-way clutch **62** is engaged with the braking plate **61**, such that rotation of the one of the rotating shafts **32** (i.e., the front one of the rotating shafts **32**) in the second rotational direction drives the braking plate **61** to rotate as well via the one-way clutch **62**. Notably, since the braking plate **61** rotates relative to the resistance unit **63**, the frictional force is formed therebetween to impede the rotation of the braking plate **61** and the rotating shafts **32** in the second rotational direction. As such, the user may hold onto the tail sections **423** of the handgrip **42** to properly apply more walking or running force onto the treadmill **5** to keep the top section **51** moving forwardly against the frictional force.

Referring to FIGS. **1**, **6** and **7**, the second embodiment of the disclosure is similar to the first embodiment, with differences in the design of the resistance unit **63**. In the second embodiment, the resistance unit **63** further includes a driver **66** that is mounted to the frame body **31** and that is connected to the adjusting members **643**, and a controller **67** that is mounted to the handrail **42** and that is electrically connected to the driver **66**.

The controller **67** allows the user to facilitate operation of the driver **66**, which is operable to be turned on for driving the adjusting members **643** to adjust the distance between the stationary seat **641** and the movable seat **642**. In the embodiment, the driver **66** is primarily driven by electric motors. Overall, the second embodiment enables remote control of the adjusting members **643**.

Referring to FIGS. **8** to **10**, the third embodiment of the disclosure is similar to the first embodiment, with differences in the design of the adjusting subunit **64**. In this embodiment, the one-way damping device **6** is mounted to the right end of the frame body **31** and is connected to the rotating shaft **32** mounted to the rear end portion **312** of the frame body **31**. The adjusting subunit **64** has a stationary seat **641** that is fixedly mounted to the frame body **31**, two guiding members **645** that are fixedly and non-rotatably mounted to the stationary seat **641**, a movable seat **642** that is connected to the guiding members **645**, two resilient members **644** (only one is visible), an adjusting base **680** that is fixedly mounted to the frame body **31**, and an adjusting screw subunit **681**.

The guiding members **645** are spaced apart in the front-rear direction (X) and extend in the left-right direction (Y). The stationary seat **641** is disposed to the left of the braking plate **61**, and the movable seat **642** is disposed to the right of the braking plate **61** and the stationary seat **641**. The movable seat **642** is connected to the guiding members **645** and is movable in the left-right direction (Y) relative to the stationary seat **641**. Each of the resilient members **644** is sleeved to a respective one of the guiding members **645**, and has two opposite ends respectively and resiliently abutting against the stationary seat **641** and the movable seat **642**.

The adjusting base **680** has a coupling segment **601** that is disposed at aside of the movable seat **642** which is opposite to the stationary seat **641** in the left-right direction

(Y) and that is spaced apart from the movable seat **642**. Referring to FIGS. **9** to **11**, The adjusting screw subunit **681** has a screw **682** that threadedly extends in the left-right direction (Y) through the coupling segment **6801** of the adjusting base **680**, and a contact member **685** that is removably mounted to one end of the screw **682**.

The contact member **685** is disposed between the coupling segment **6801** of the adjusting base **680** and the movable seat **642**. The adjusting screw subunit **681** further has a retaining member **686** that is mounted to the screw **682**, that is disposed at a side of the contact member **685** opposite to the movable seat **642** and between the coupling segment **6801** of the adjusting base **680** and the movable seat **642**, that expands radially and outwardly from the screw **682** and that prevents the screw **682** to be disengaged from the adjusting base **680**.

The adjusting screw subunit **681** further has a knob **687** that is co-rotatably mounted to an opposite end **683** of the screw **682**, and that is implemented for ease of access for the user to manually drive rotation of the screw **682** relative to the adjusting base **680**, which in turn drives movement of the screw **682** in the left-right direction (Y) for adjusting the distance between the stationary seat **641** and the movable seat **642**. When the knob **687** is rotated in a first rotational direction, the contact member **685** is driven to abut against the movable seat **642** to push the movable seat **642** toward the stationary seat **641**, which progressively increases the frictional force generated by the friction producing subunit **65**. On the other hand, when the knob **687** is rotated in a second rotational direction opposite to the first rotational direction, the contact member **685** is pulled away, and the resilient members **684** push the movable seat **642** away from the stationary seat **641**, which effectively reduces the frictional force generated. In this embodiment, the knob **687** is also designed to be removably mounted to the screw **682** to prevent unintentional adjustment. The screw **682** is formed with an insertion hole **684** at the opposite end **683** of the screw **682**, and the knob **687** has an inner positioning portion **688** fittingly engaged to the insertion hole **684**. In addition, shape of the opposite end **683** of the screw **682** is designed in such a way to be fittingly engaged with an outer positioning portion **689** of the knob **687** to ensure that the screw **682** and the knob **687** are co-rotatable with each other.

In a modification of the third embodiment, the contact member **685** may be removed, so that the screw **682** directly abuts against the movable seat **642**. Referring to FIG. **12**, in another modification of the third embodiment, the screw **682** is rotatably engaged to the movable seat **642** without neither the contact member **685** nor the retaining member **686**.

Overall, the implementation of the one-way damping device **6** in the treadmill **200** allows the user to do more types of exercises on the treadmill **200** without sacrificing the original safety design. The user may apply walking or running force onto the treadmill belt **5** to drive the top section **51** of the treadmill belt **5** to move in one of two opposite directions: one direction for regular running exercise, and the other direction for leg muscle training.

In the description above, for the purposes of explanation, numerous specific details have been set forth in order to provide a thorough understanding of the embodiment. It will be apparent, however, to one skilled in the art, that one or more other embodiments may be practiced without some of these specific details. It should also be appreciated that reference throughout this specification to "one embodiment," "an embodiment," an embodiment with an indication of an ordinal number and so forth means that a particular feature, structure, or characteristic may be included in the practice of the disclosure. It should be further appreciated that in the description, various features are sometimes grouped together in a single embodiment, figure, or description thereof for the purpose of streamlining the disclosure and aiding in the understanding of various inventive aspects, and that one or more features or specific details from one embodiment may be practiced together with one or more features or specific details from another embodiment, where appropriate, in the practice of the disclosure.

While the disclosure has been described in connection with what is considered the exemplary embodiment, it is understood that this disclosure is not limited to the disclosed embodiment but is intended to cover various arrangements included within the spirit and scope of the broadest interpretation so as to encompass all such modifications and equivalent arrangements.

What is claimed is:

1. A treadmill comprising:

a base frame including

a frame body that has a front end portion and a rear end portion opposite to said front end portion in a front-rear direction, and

two rotating shafts that are respectively mounted to said front and rear end portions of said frame body, each of said rotating shafts being rotatable relative to said frame body about a rotational axis which extends in a left-right direction transverse to the front-rear direction;

a treadmill belt trained on said rotating shafts and having

a top section that is defined between top ends of said rotating shafts, said top section

being rearwardly movable around said rotating shafts to drive each of said rotating shafts to rotate about the rotational axis in a first rotational direction, and

being forwardly movable around said rotating shafts to drive each of said rotating shafts to rotate about the rotational axis in a second rotational direction which is opposite to the first rotational direction; and

an one-way damping device including

a braking plate that is rotatable about a rotational axis extending in the left-right direction,

an one-way clutch that is sleeved on the one of said rotating shafts, that is not engaged with said braking plate when said top section of said treadmill belt is moved rearwardly, and that is engaged with said braking plate when said top section of said treadmill belt is moved forwardly such that rotation of the one of said rotating shafts in the second rotational direction drives said braking plate to rotate in the second rotational direction via said one-way clutch, and

a resistance unit that is fixedly mounted to said frame body and that abuts against said braking plate so that, when said top section of said treadmill belt is moved forwardly, said braking plate is rotated in the second rotational direction against a frictional force between said braking plate and said resistance unit.

2. The treadmill as claimed in claim **1**, wherein said resistance unit includes

a friction producing subunit that abuts against said braking plate for generating the frictional force; and

an adjusting subunit that is fixedly mounted to said frame body, that is connected to said friction producing subunit, and that is operable to adjust a magnitude of the frictional force.

3. The treadmill as claimed in claim **2**, wherein:

said adjusting subunit has

a stationary seat that is fixedly mounted to said frame body,

a movable seat that is spaced apart from said stationary seat in the left-right direction, said stationary seat and said movable seat being disposed respectively at opposite sides of said braking plate, and

at least one adjusting member that extends in the left-right direction, that interconnects said stationary seat and said movable seat, and that is operable to adjust a distance between said stationary seat and said movable seat; and

said friction producing subunit includes two resistance members that are respectively and fixedly connected to said stationary seat and said movable seat, and that cooperatively clamp said braking plate therebetween.

4. The treadmill as claimed in claim **3**, wherein said adjusting subunit further has a resilient member that has two opposite ends respectively and resiliently abutting against said stationary seat and said movable seat.

5. The treadmill as claimed in claim **3**, wherein said adjusting subunit has two of said adjusting members that are spaced apart in the front-rear direction, that threadedly engage said stationary seat and said movable seat, and that are rotatable to move said movable seat in the left-right direction relative to said stationary seat.

6. The treadmill as claimed in claim **3**, wherein said drag adjusting subunit further has

a driver that is connected to said at least one adjusting member and that is operable to be turned on for driving said at least one adjusting member to adjust the distance between said stationary seat and said movable seat, and

a controller for facilitating operation of said driver.

7. The treadmill as claimed in claim **2**, wherein:

said adjusting subunit has

a stationary seat that is fixedly mounted to said frame body,

at least one guiding member that extends in the left-right direction and that is mounted to said stationary seat,

a movable seat that is connected to said at least one guiding member and that is movable in the left-right direction relative to said stationary seat,

an adjusting base that is fixedly mounted to said frame body and that has a coupling segment being disposed at a side of said movable seat which is opposite to said stationary seat in the left-right direction and being spaced apart from said movable seat, and

an adjusting screw subunit that threadedly extends in the left-right direction through said coupling segment of said adjusting base, and that is rotatable relative to said adjusting base to push said movable seat toward said stationary seat; and

said friction producing subunit includes two resistance members that are respectively and fixedly connected to said stationary sea and said movable seat, and that cooperatively clamp said braking plate therebetween.

8. The treadmill as claimed in claim **7**, wherein said adjusting screw subunit has

a screw that threadedly extends in the left-right direction through said coupling segment of said adjusting base, and that has one end for abutting against said movable seat to push said movable seat toward said stationary seat, and

an knob that is co-rotatably and removably mounted to an opposite end of said screw.

9. The treadmill as claimed in claim **8**, wherein said adjusting screw subunit further has a retaining member that is mounted to said screw, that expands radially and outwardly from said screw, and that prevents said screw to be disengaged from said adjusting base.

10. The treadmill as claimed in claim **7**, wherein said adjusting screw subunit has

a screw that threadedly extends in the left-right direction through said coupling segment of said adjusting base, and that has one end rotatably engaged to said movable seat, and

an knob that is co-rotatably and removably mounted to an opposite end of said screw.

11. The treadmill as claimed in claim **7**, wherein said adjusting screw subunit has:

a screw that threadedly extends in the left-right direction through said coupling segment of said adjusting base;

a contact member that is mounted to one end of said screw for abutting against said movable seat to push said movable seat toward said stationary seat;

a retaining member that is mounted to said screw, that is disposed at a side of said contact member opposite to said movable seat, that expands radially and outwardly from said screw, and that prevents said screw to be disengaged from said adjusting base; and

an knob that is co-rotatably and removably mounted to an opposite end of said screw.

12. The treadmill as claimed in claim **7**, wherein said adjusting subunit further has a resilient member that has two opposite ends respectively and resiliently abutting against said stationary seat and said movable seat.

13. The treadmill as claimed in claim **1**, further comprising a handrail unit that includes at least one upright support frame that has a bottom end connected fixedly to said frame body, and a handgrip that is mounted to a top end of said at least one support frame.

14. The treadmill as claimed in claim **13**, wherein:

said handrail unit includes two of said supporting frames that are fixedly and respectively mounted to opposite left and right ends of said frame body of said base frame; and

said handgrip has

two side rail sections that extend in the front-rear direction and that are respectively and fixedly mounted on top ends of said supporting frames,

a front rail section that extends in the left-right direction and that interconnects front ends of said side rail sections, and

two hook-shaped tail sections, each of which has a first part extending downwardly from a rear end of a respective one of said side rail sections, and a second part extending forwardly from a bottom end of said first part.

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